Menlo Park Notebook #2 [N-78-11-22]

This notebook covers the period November 1878-June 1879. Most of the entries are by Charles Batchelor and Francis Upton. There are also entries by Edison and John Kruesi. The name of Martin Force appears occasionally as a witness. Almost all of the material relates to experiments on electric lighting. Included are notes and drawings of spiral filaments; tests of filaments brought to incandescence with batteries and generators; notes, drawings, and calculations about generators; drawings of a MacCleod gauge; and notes by Edison on another inventor's arc light patent. There are also drawings of the telephone, notes on chalk and carbon buttons, and a memorandum by Edison on Frank McLaughlin's prospecting trip to the Chandiere River in Canada. The book contains 262 numbered pages.

Blank pages not filmed: 48-49, 112-115, 118-131, 136-137, 158-201, 206-224, 227, 230-262.

Missing page numbers: 225-226.

No 2

12,	30,
9,36	27,86
6,50	2,14
27,86	

16,
5
80

Nov 22 1878
T A Edison
Chas Batchelor
P

Pt spiral

platinum outside
below the

Edison Lab

No 2

12,
9,36
6,50
27,86

30,
27,86
2,14

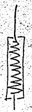
16,
5
80

3.

ay1, 189

Nov 22 1878
T A Edison
Chas Batchelor

Pt spiral



platinum outside fused before the Embedded Spiral

The platinum spiral was imbedded in plaster paris but this had so much water that it cracked inside Zirconium should be used & spiral heated as Zirconium is under pressure

Electric Light Dec 5 1878

Batchelor

To be made immediately + shown on Friday afternoon —

2 old style lamps double spiral square

1 Lamp (long spiral) about ~~No~~ 6 springs

2 Lamps new pattern.

Get some platina wire size for springs

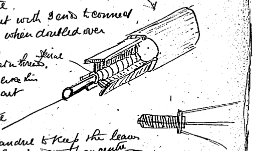
Electric Light Dec 4th 1878

Chas Batchelor

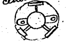
Machine for filling spirals with chalk or other insulator

Spirals must be made with equal numbers of threads

1 Mandril made as per drawing



2 Through hinges back.
3 first put on a clamp like this
4 then put on the slate.
5 then bottom platina cut with 3 ends to connect with the screws when doubled over
6 then put spiral on and throw down leaves & set in threads.
7 put an end in of platina like this with (thread in thick part
8 then put another clamp like this
9 then put a piece on Mandrel to keep the leaves together and the right distance from centre

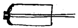


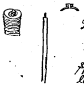
10 Now fill with chalk
11 then put screws in your clamps
12 " take end off and throw back your clamps
13 Now fill with chalk the places where the leaves were
14 then screw together by the clamps till you have the right size
15 Now put in slate mandril & heat up high.
16 screw in the platina rod & put collar below the bottom & take off top clamp & it is ready for mounting in the instrument.

Electric Light

Dec 3d 1878
Chas Batchelor

Mode of fastening the ends of spiral into end pieces





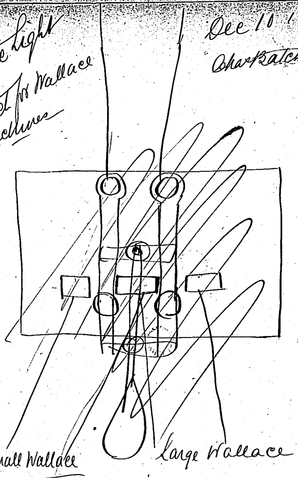
Platina rod is threaded on end and a shoulder cut on it
spiral has the end piece lapped over and pierced, so as to let screw through to fasten to top cap

Electric Light

Protest for Wallace machines

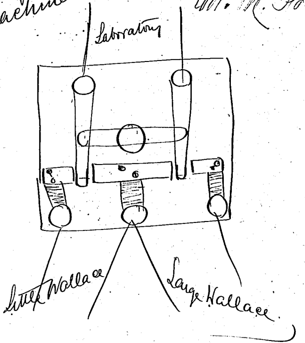
Dec 10 1878

Chas Batchelor


Small Wallace
Large Wallace

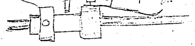
Electric Light
Switch for Wallace
Machines

Dec 10 1878
Chas Batchelor
M. N. Force


Laboratory
Little Wallace
Large Wallace

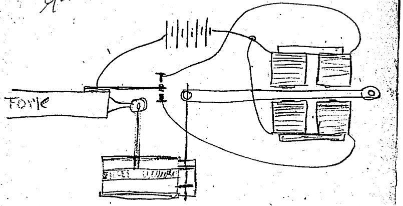
Electric Light Dec 11 1878

Tuning fork dynamo Chas Batchelor


Moveable collar
Valve driver
spring to give friction on shaft

Electric Light
Magneto Electric
Generator

Dec 11 1878
Chas Batchelor
M. N. Force



Make the piston thinner & put bearing near crosshead

Connect it up so as to be at rest exactly in centre of cylinder

put new collars on valve stem

Shoulder screw for armature

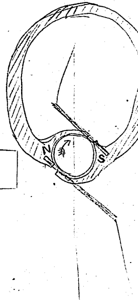
Stud instead of screw in end of armature

Joint up the pipes

Stop screws for armature

Gramme Machine
Commutator

Dec 20th 1878
Chas Batchelor



In Gramme armature the pole is carried round in direction of revolution. So it ought to made as in sketch with poles where it is.

Magnetism

When the internal resistance of the magnet equals external the best effect is obtained. Ohms law applies to Magnetism.

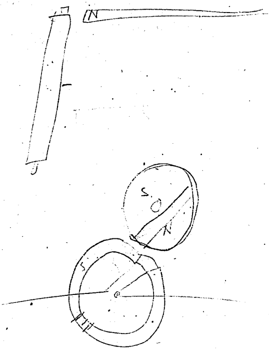
E

~~Pt. sp~~

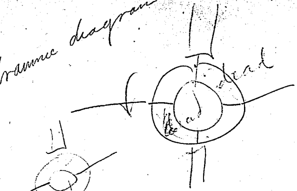
A Pt. spiral moved when heated and no more light given out. Stick gave more owing to greater oxydation.

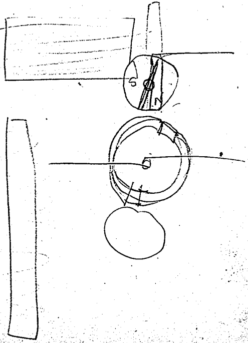
E

The spiral was rapidly revolved holding it in the hand.

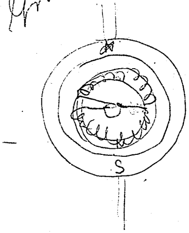


Gramme diagram

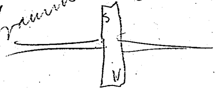


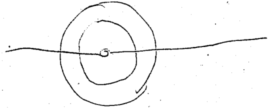


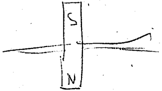
Gramme ring

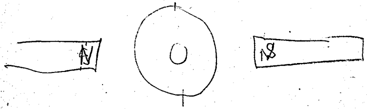


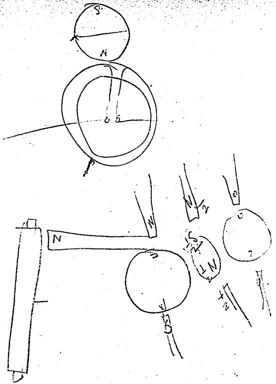
Gramme ring



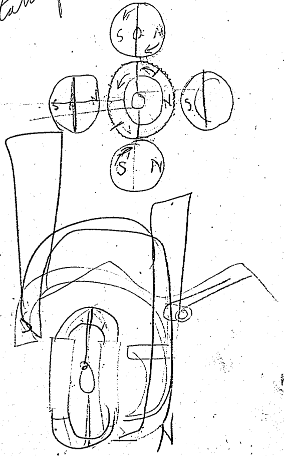




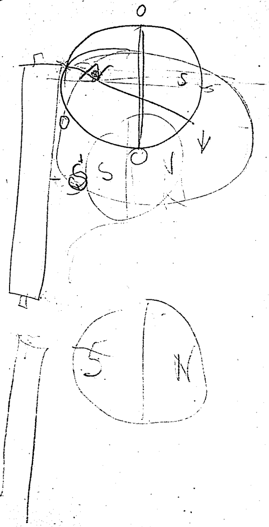




Gramme ring
rotating magnets



Gramme


O
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V
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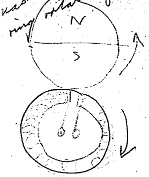
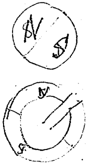
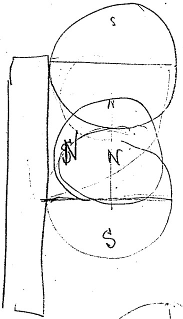
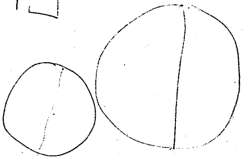
Gramme machine
magnets and ring rotating



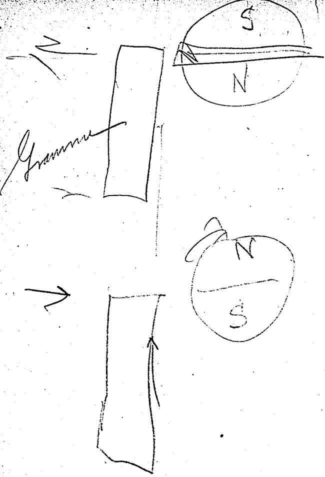


Gramme





Gramme

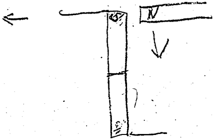


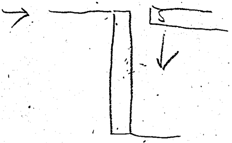
Magnetism
Law of currents induced

Weakening S same as
strengthening N

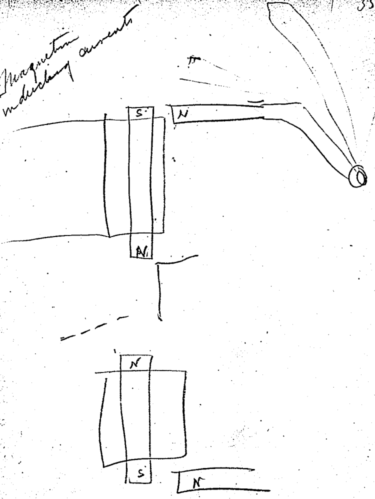
stren —— S " "
weakening N

Carried in same direction

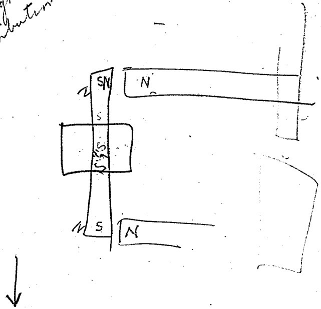




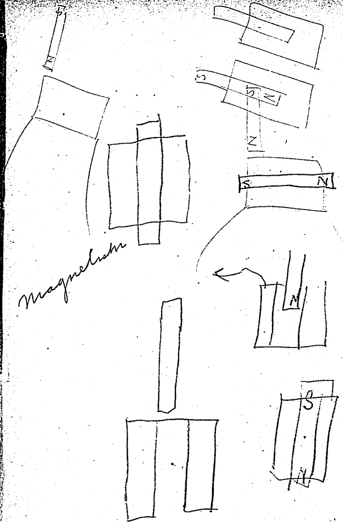
Magnetism inducing currents

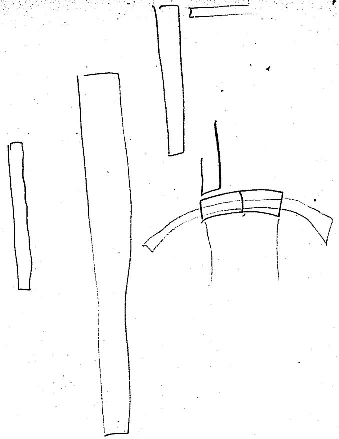


Magnetisation distribution of induced

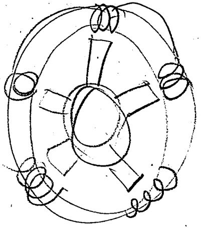


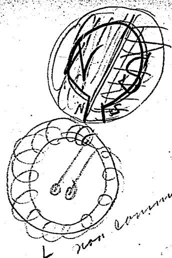
magnetisation


S
N
S
S N
Z
S
N
N
S
N

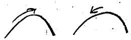


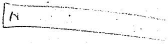
Gramme ring

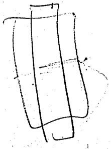




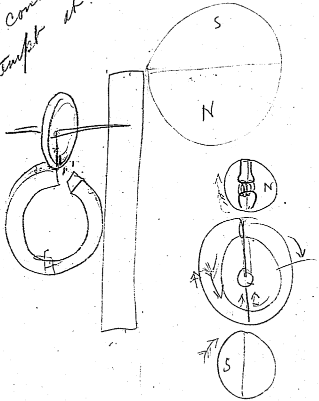
Attempt at non commutator

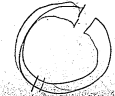




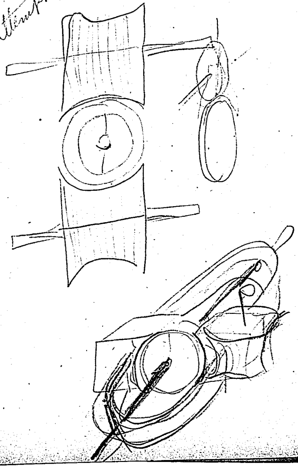


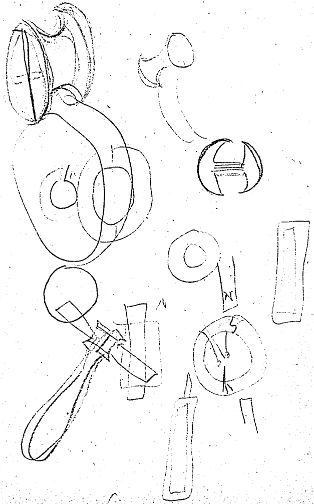
Non commutator
attempt at.

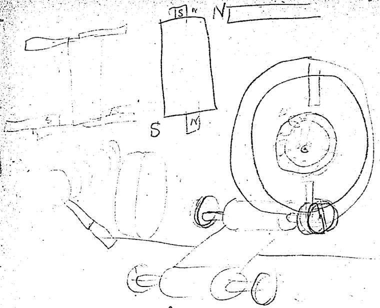




More commutator attempt at.




S
N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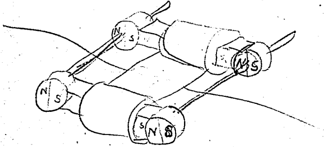
N
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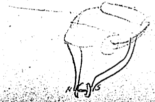
N
S

84.5
15.5

3 ohms

63.6
36.4

1 ohm

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15 : 84.5 :: x : 3

```
84.5)45.00(.53
     42 25
      2750

63.6)36.40(.57
     31 80
      4600
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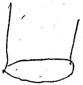
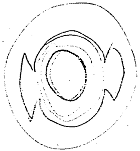
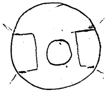


Galvanometer





39 3/4

~~πD~~

~~2πR~~

1/2 R

~~πR~~ 2

No 16 wire

.065

.065
.065
3.2.5
1

.0325
.0325
5

.065
– 5
.07

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.035
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3675
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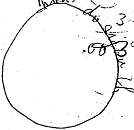
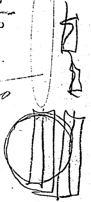
1150 to the Ohm

407 feet





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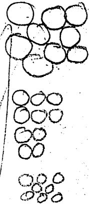

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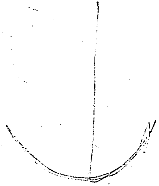

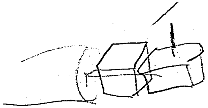

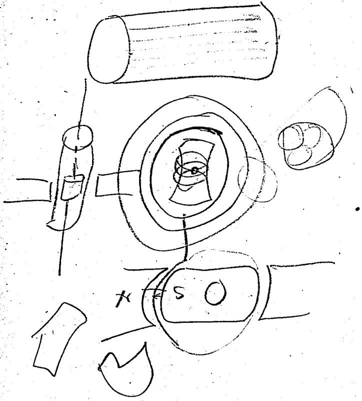
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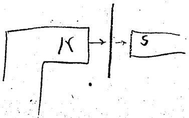
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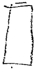
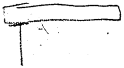
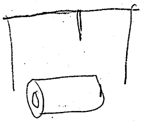
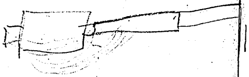








68,376

68.376   4.834900
1.390   3.143015

~~comp 33000~~   7.977915
95,000,000
comp 33000   4.578514

3.399401

60/2508. H.P. for a minute
60/41.7 H P in an hour.

2,000 Grammes H.

68.376

68.376
772

1 Lb of H will give — H. P. burned in O.

34.462   4.537345
772   2.887617

26,600000   7.424962
33000   4.518514

2.906448

60/806

13.4 H.P. one hour

Dechenal

1 kilo.

68,376

772

comp. log 2

34.462

$$\mathcal{E} = \frac{ci}{R}$$

$$\frac{i}{i+j} = \equiv \frac{}{}$$

$$Z = \frac{i-j}{}$$

58 59

11.2

7

2,167,539.000	9.335978
209.336	5.321645
	4.014333

10.320.

~~220 X 1990~~

~~4~~02 00.40)

.004.)1.000(

9

.0039

.0039)1.0000(Iron

~~I~~ 4.

8.408935

~~5.11065~~

2.408935

256.7 to double

Copper

21

62	100
256	~~200~~
318	200
256	
574	300
830	400
1086	500
1342	600
1598	700
1854	800
2110	900
2366	1000

100 Ohms wanted.

~~.007~~ .01

.01 in Diam.

$\frac{9.7}{7}$ ft per Ohm

= 1.38 ft per Ohm

$\frac{100}{1}$ 138 ft per 100 Ohms

.005

$\frac{2.42}{7} = .345$

34.5 ft per 100 Ohms

When 2000° F

Resistance is 8 1/2 times greater

$\frac{138}{8.5}$ ft. per 100 Ohms

2.139879
0.929419
1.210460   16.2

$\frac{34.5}{8.5}$ at 2000° F

1.537819
.929419
.608400

.005 in wire

4.05 ft per 100 Ohms

.020

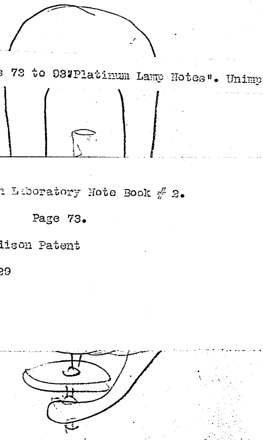
.02
3.1415
.02

.062830
7

.43981

---

11 — 50 commenced



Pages 73 to 93"Platinum Lamp Notes". Unimportant

Edison Laboratory Note Book # 2.

Page 73.

See Edison Patent

227,229

.020

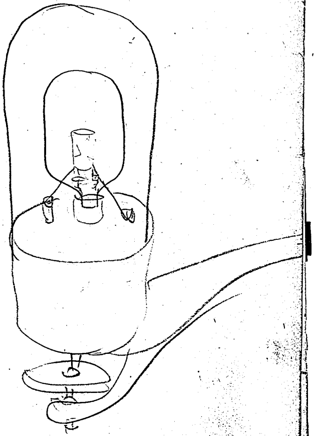
.02

3.1415

2

.062830

7



~~1.1004~~

1.0000

Feb. 8 1879

Platinum Iridium .020 Wi
wound in spiral on
heated once for a
moment to redness in air
then weighed.

Wt. 1.1004 gms (1)

11-55 Then placed in a vacuum
brought to a bright red
Vacuum .2 in 3 cells
kept at red 10 minutes

---

6 cells incandescent

Table

	Loss	Total
1.1004		
1.1000	.0004	.0004

$$\begin{array}{r} 49 \\ 6 \\ \hline 294 \end{array}$$

.0004/1.1000.0

4/11000

3/2750

4/916

6/279

49 Days

to lose 1/4

---

9 cells 11-45 a.m

Full incandescent

Lower part of the coil seemed to be cross circuited as two turns remained cool

11 cells very white

12 cells 11-48 a.m.

Vacuum holds at 2

Taken off at 11-52 a.m

1.1000 Gr weighs (2)

1.1.004

$\frac{4}{11004}$ $\frac{1}{2751}$

1

1004

1

$\frac{4}{10000}$ $\frac{4}{\;}$

12.38 PM

Spiral—White heat

8 cells C+H new fluid

Vacuum—2 —

12.44 we put 9 cells on

12.47 we put 10 cells on

12.56 " " 11 " "

1. 2 PM 12 cells

1 20 White 13 cells

1 29 White after a shaking

1 38 Yellow

3 Wt 1.0998 Grms.

1:54 P.M Vacuum .2

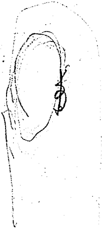
Acid added out line

6 cells

2 P.M 8 cells white

2-5 " 10 " "

Noticed on the glass a few transparent crystals probably from dirt on the substances wh. have been placed in it as it was not thoroughly clean when Ex. commenced. Seemed to have distilled from the top of glass case

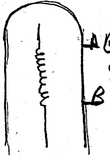


2.25 P.M. 13 cells

Lost .000$\frac{1}{2}$

= .00005

Noticed a black coating around the wire wh. seemed to have a metallic lustre, when looked at against a dark



Between ~~these~~ A & B Extremely thin scarcely noticable

Gramme Machine

3-35 Very full white

Galva 60°

About 4 Ohms in circuit

lamps probably .8 Ohm

The vacuum was once very poor

Look out 4 '09

Measured resistance cold lamp

.73 Ohms

Total 3.3

78

2.6

Platinum Spiral

Put in 8.51 P.m.

Weight 1.1243 mgm

60
16
76
6

Taken off 8.57

Put on again 9.02

Taken off 9.10

Put on again 9.11

Taken off 10.07

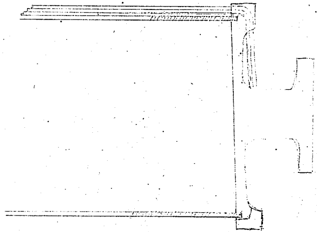
been on 70 minutes

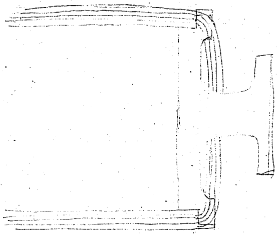
It now weighs 1.1242

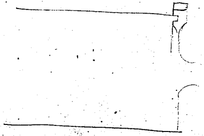
having lost 1/10 of a mgm

Put it on again 10:20
Took. it off at 10:50
Weighed 1.1240
Lost in 100 minutes. 3/10 mgm
Put it on again at 11 p.m.
for an hour

took off at 12 m
Weighed 1.1237







375 [illegible] = 9375
25
1875
750
9370

2.985

314) 9.375
628
3095
2826
2690
2512
1780

[illegible] = 125
3.5

1125
942
1830

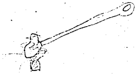
13.8

$\frac{1000}{138} \times 68$

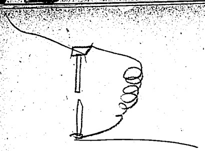
23)10000(

$\frac{1020}{\cancel{138}}$ ~~× 60~~

23)1020(44,39
92
100
92
80
69
210
207



The invention is for regulating the distance apart of the Carbon Electrodes = and he in 1 case uses the movement in a metallic conductor due to the passage of the Current effect directly or to release certain mechanism to Effect the ~~[illegible]~~, separation of the Carbons



He shunts the arc with a magnet or solenoid, & in pp 44 & 49 6 - [illegible] Says that he uses the Expansion of wire to Effect the Separation of the Carbons & the magnet to release the mechanism, this magnet forms a Constant derived Circuit around the arc

~~in another arrangement~~

~~He~~
In, case he meants a
fusible wire in the derived
circuit around the arc
containing the magnet
to prevent its destruction
with great certainty.

in another arrangement
se~~[illegible]~~p 4, line 9410
the fusible wire, (which is
not the expansible wire)
~~this~~ fusible wire connects
to a commutator which

comes in play only when
the wire fuses. and thus
preserve the continuity of
the circuit, so that other
lamps shall continue to
burn; now the expansion
of this fusible wires produces no
effect whatsoever as
it only can work by its
fusion & when the lamp
has reached a point
it cannot work

~~[illegible]~~

In one case he mentions
that a uni-metallic device
may replace the fusible
wire around the Carbon points whose expansion
may connect ~~a short~~
the commutator a ~~the~~
~~[illegible] of [illegible] to~~
~~close so as to close the~~
~~circuit of the arc of the~~
~~is the case~~ the circuit of
the arc, now if this

Expansion wire is around
the arc; ~~it would permanently~~
~~short circuit it owing to~~
~~its low resistance, the expansion~~
~~that it is to replace the fusible wire,~~
~~if it was in the main~~
~~circuit~~ outside of the
~~lamps~~ (~~[illegible]~~ and forms a
derivation around it in
connection with the [illegible]
of the mechanism releasing magnet
it would ~~contract~~ Expand upon the
arc being broken by a
greater accession of.

Current thus it is
supposed would bring the
Commutator into play &
short circuit the arc,
but the effect of this
Expansion is not to
throw in & out resistance
because the resistance is
always in circuit & is
independent in this
gradation of the
movement of the
Expansible wire.

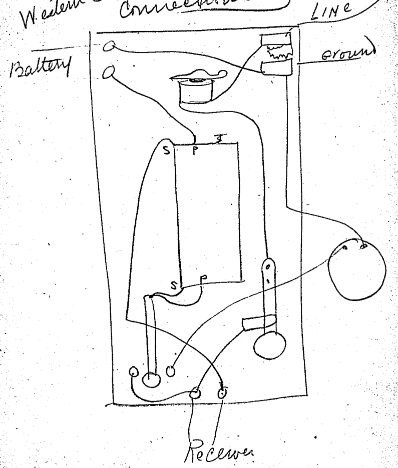
not only does this device
~~not throw in & out~~ resistance
~~of~~ in the line Either to
regulate or vary the strength of
the current but is only
used in cases when the
~~lamp goes off arc has~~ light
has been destroyed ~~it~~
~~does not~~ neither does
it regulate in any
manner the [illegible]
of the Lamp

It will be noticed
that the resistance
which he uses is along
in the line, and is of so
such an amount that it
is proportioned to the
strength of the current
Further that he does
not describe, allude or claim any method
~~to~~ whereby the expansion of
a conductor is made to
throw in & exclude from

a circuit a resistance,
I wish further to remark
~~that~~ I have submitted
the Specification and
drawings to several skilled
Experts in th~~at~~ the art to
which it relates and
~~that~~ they are unable
to any similarity between
the two inventions ~~written~~ not only do
they see no ~~similarity~~ similarity but
~~Can~~ they cannot understand
how an operative mechanism
could be made from the

general and Confusing statement of the patent in question

Western Electric Telephone Connections


LINE
Ground
Battery
S
P
I
S
P
Receiver

2 cts.

365

36.50
2
7300
2
14600
2
29200

36.50
2
73.00
2
14600
2
29200
2
58400

36.50
18.25
54.75
2
10950
2
21900
2
43800

73.
24
292
146
1752

54.75
24
21900
10950
1314.00

36.50

5/16

16 | 5.0 (.3125
48
20
16
40
32
80

.3125 inches surface

.03125 ~~inches~~ a straight wire having 10 ohms

004
314
.01256
3
.03768

(12.5 ~~ohms~~
4.13 ~~inches~~
in 4 inches

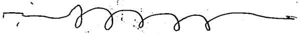
.005 .00

.003

.004

~~4~~
~~8~~

4 inches 4)64 64
16



44.
16
264
44
704
176
528
176

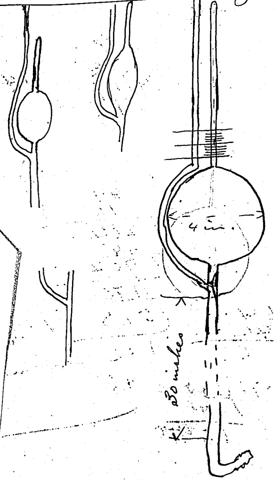
ft. lbs
per candle

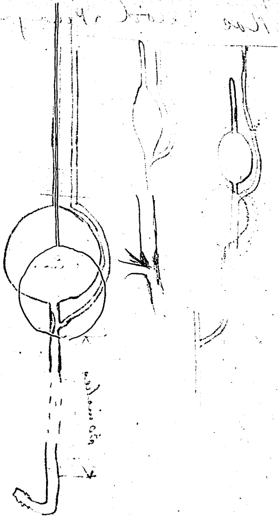
64

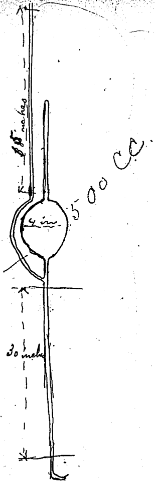
64
44
26

176)33000(18
176
1540

Mac Cleod Guage




25 inches


88 inches
500 CC.
4 in.
30 inches

.76

3800
8

30400

6

64.

64) 3800. (59.
320
600
576

64
59

64
60

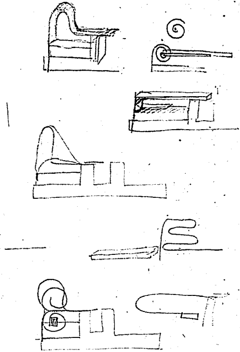
3840.

1

5 100

2

1 2



~~16~~0	2.2041
~~77~~2	2.8872
~~10~~	1.
	6.091.3

1,230,000

	6.0913
33.000	4.5185
	1,5728

37.4

3/39

13

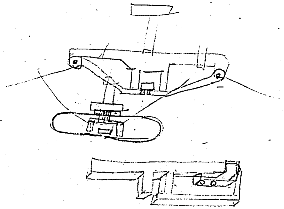
4

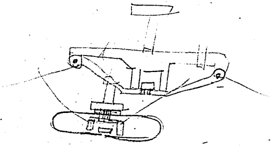
3/4.00

3/1.333

4/.444

.111





~~160~~ 2.2041
~~772~~ 2.8872
~~10~~ 1.

6.0913

1,230,000

6.0913
33.000 4.5185
1,5728

37.4

3 3/39
13

4

3/4.00
3/1.333
4/.444
.111

	P.	S.	T.
1	.41	118	405
2	.41	116 with bells	380
3	.42	140	405
4	.43	140	430
5	.42	145	430
6	.43	147	427
7	.35	145	372
8	.43	143	427
9	.35	150	425
10	.43	140	430
11	.43	142	442
12	.46	135	400
13	.43	137	420
14	.45	136	410

New Coils with proper amount of Resistance

Saxon

Numbers of Instrument

Sept. 29

J. F. [illegible]

25 X
36 X
34 X
28 X
48 X
49 X
32 X
43 X
39
29

X means good

35 good. R.

	R	S with B	L
48	.47	124	347
38	.40	122	ab 370

changed

9

49

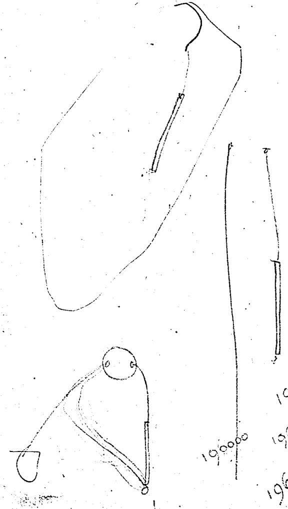
9

49.

Tests of Coils of Edison telephones

Sept 19th 1879

No of Inst	Primary	Secondary	Tertiary	Remarks
33.	OK .32	with Bell 141.	350.	
23	.40	141		
34	.20	125		must be fixed
43	OK. 25			Fix [illegible]
41	.40	143	417	
36.	.20	—	—	investigate
29	OK. 21			investigate
46	.24			investigate
49	OK .05			Big bug
51	.34	153	370	
37	.40	128	379	
26	.41	with Bell 142	377	
31	.26			
33	.31	143	375	
43	.24	130	372	
46	.44	174	435	



19667

196966

19000

190000

196000

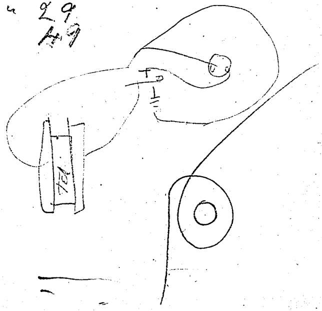
19676

11.20

No 29 — 23 Light pressure — Heavy press

Nos. of Telephones whose coils have been changed

No 32
" 43
" 39
" 29
49



	Light pressure	Heavy pressure 7lbs
No 49	5.	
No 29	23	11.20.
" 36	6.30	2.9.
43	16.5	7.3
34	Insulated at all pressure	

20.

40

Test to ascertain reliability of resistance in hard carbon buttons,

NO	LIGHT PRESSURE	HEAVY PRESSURE
29	23.00	11.20
36	6.30	2.9
43	16.5	7.3
34	Insulator	Insulator.
46	3.0	2.0
34 Thompson Carbon [illegible]	11.20.	5.
Our Lancablack Carbon [illegible]	33.00 — little heavier Pres = 24 ohms	14.
ditto filed flat	ohms 47.95 —	ohms 12 1/2 (Varying = 4 [illegible] .3[illegible]
again	33 ohms = talking loud 26	again 27.40 again talking 92.
Pure Plumbago	6.80.	1.61

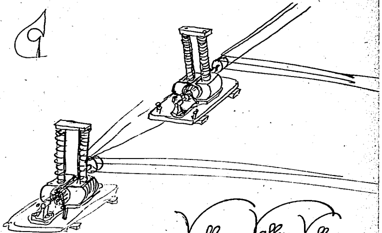
McLaughlin has just returned from
the Chaudiere River & the Leloups
Canada where there are placer mines
This alluvial is said to contain
a minute trace of Platinum & Iridosmine
McL brings some of the black sand
from the sluices before the fine gold
is panned from it. By the aid
of the Microscope I ascertain that
the platina is combined with the
gold also in seperate pieces,
the Pt is not alloyed with Au but
is in contact with it. - The amount
of Platinum is about $\frac{1}{4}$ that
of the Gold. Iridosmine is very
plentiful. It forms a large

bulk of the sand there is
probably 6 oz of Iridosmine
to every oz of gold, I have
found that Sodium amalgam
will take up the Iridosmine &
platinum, the Au being previously
taken out by pure mercury —
There is undoubtedly enough
Pt & Iridium in the Canada
district to supply the world
instead of the blocks and
Containing a trace of the platinoid
The mine should be called a
platinoid mine with trace of
gold —

T. A. E. —

June 6 1879 —

G



Valley Valley Valley

Portchester

Wabash

Portchester Valley

Portchester

Portchester Wabash

Memphis Memphis

The substidution of the efficacy due to

Memphis

Portland maine Maine Maine

Now by Saint Paul my Golden

Maine Maine Maine

Memphis Memphis

Frangapani Frangapani

Memphis Memphis

Valley Valley Valley Valley

Saturated economics Economics

Chaudiere Economics

Chaudiere

Franklincle

Chaudiere Chaudierix

Circumference

Chaudiere Frangapani

Chaudiere

Frangapani

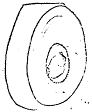
Saturated Solution of Caustic potash =

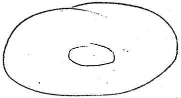
fuse ~~the~~ solid salt of Caustic potash & also of Soda in molten state pour in a mould & then turn them off =

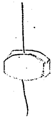
also fuse the Caustic soda mixed with 1/4 its weight of chalk mix & pour hot =

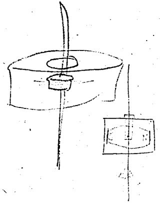
Ditto with the potash ~~solution~~ salt

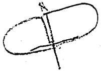
again make another and mix 1/2 its weight of Chalk =

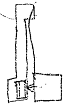


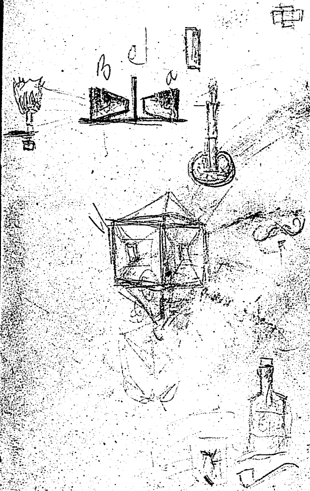
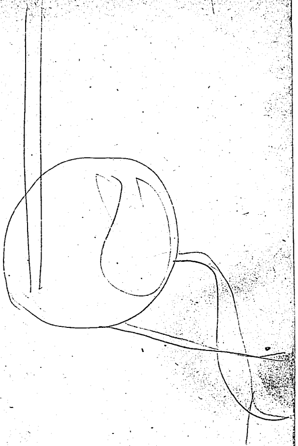











B
d
a